

WHAT IS CLAIMED IS:

1. A method for fabricating a capacitor comprising the steps of:

- 5 forming a first insulating layer having a first opening exposing a predetermined region on a substrate;
- forming a conductive plug filled within the first opening;
- forming a second insulating layer having a second opening exposing the conductive plug on the first insulating layer;
- 10 forming a conductive layer covering the second opening by sequentially performing PECVD and LPCVD processes on the second insulating layer;
- 15 exposing the second insulating layer by performing etch back on the conductive layer;
- forming a storage node electrode of the capacitor by removing the second insulating layer;
- forming a dielectric layer to cover the storage node electrode; and
- 20 forming a plate electrode.

2. The method for fabricating a capacitor according to claim 1, wherein the conductive layer comprises ruthenium (Ru).

3. The method for fabricating a capacitor according to claim 1, wherein the plate electrode comprises a ruthenium (Ru) layer or TiN layer.

5 4. The method for fabricating a capacitor according to claim 1, wherein the PECVD process and the LPCVD process are performed in the same chamber.

10 5. The method for fabricating a capacitor according to claim 1, wherein the conductive layer is formed under conditions of a temperature maintained at between 200 and 350°C and power supplied between 100 and 300 Watts.

15 6. The method for fabricating a capacitor according to claim 1, wherein, after the step of forming the conductive layer, further comprising the step of performing a first thermal treatment on the conductive layer in an atmosphere of N₂.

20 7. The method for fabricating a capacitor according to claim 6, wherein the first thermal treatment is performed by supplying N₂ gas at a flow rate of between 10sccm and 10slm at a temperature of between 600 and 1000°C.

8. The method for fabricating a capacitor according to claim 1, wherein the dielectric layer comprises TiON.

9. The method for fabricating a capacitor according to claim 8, wherein the TiON layer is formed by supplying TiCl₄ source gas and NH₃ reaction gas at a flow rate of between 10 and 1000sccm, maintaining the inside of the chamber at a temperature between 170 and 190°C.

10. The method for fabricating a capacitor according to claim 8, wherein the TiON layer is formed under conditions of pressure of the chamber maintained at between 0.1 and 1.2Torr and the temperature of substrate maintained at between 300 and 400°C.

11. The method for fabricating a capacitor according to claim 1, wherein, after the step of forming the dielectric layer, further comprising the step of performing a second thermal treatment on the dielectric layer.

12. The method for fabricating a capacitor according to claim 11, wherein the second thermal treatment is performed at a temperature of between 300 and 500°C for 1 minute.

13. The method for fabricating a capacitor according to claim 11, wherein the second thermal treatment is performed at a temperature of between 500 and 650°C by using N₂ gas.

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14. The method for fabricating a capacitor according to claim 11, wherein the second thermal treatment is performed by supplying a mixed gas comprising N₂ and O₂ in a plasma state.

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15. The method for fabricating a capacitor according to claim 11, wherein the second thermal treatment is performed by supplying a mixed gas comprising O₂, O₃ and N₂O.

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16. The method for fabricating a capacitor according to claim 11, wherein the second thermal treatment is performed by supplying O₃ under UV radiation.

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